**REMARKS:**

Claims 1, 4, 5-7, 9, 12, 13, 15, 17, 20, 21, 23, 25, and 26 are currently pending in the application.

Claims 2, 3, 8, 10, 11, 14, 16, 18, 19, 22, 24, and 27-49 have been previously canceled without *prejudice*.

Claims 6 and 26 have been previously withdrawn from further consideration.

Claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 stand rejected under 35 U.S.C. § 103(a) over *Anandalingam*, "Hierarchical Optimization: An Introduction" (hereinafter "*Anandalingam*") in view of Official Notice.

Applicants respectfully submit that all of Applicants arguments and amendments are without *prejudice* or *disclaimer*. In addition, Applicants have merely discussed example distinctions from the cited prior art. Other distinctions may exist, and as such, Applicants reserve the right to discuss these additional distinctions in a future Response or on Appeal, if appropriate. Applicants further respectfully submit that by not responding to additional statements made by the Examiner, Applicants do not acquiesce to the Examiner's additional statements. The example distinctions discussed by Applicants are considered sufficient to overcome the Examiner's rejections. In addition, Applicants reserve the right to pursue broader claims in this Application or through a continuation patent application. No new matter has been added.

## I.      Support for Current Claim Amendments

In compliance with 35 U.S.C. § 112, Applicants respectfully submit that support for the current claim amendments may be found in at least the following portions of Applicants' specification, as filed, provided below, for the Examiner's convenience:

> FIGURE 2 illustrates an example transition graph 50 that represents possible price schedules. Transition graph 50 includes states 52 at different stages 60. Stages 60 represent time intervals during which a product has a particular price. Stages 60 may represent any suitable time interval, for example, a week. Additionally, the time

intervals represented by stages 60 may be equal to each other in length or may differ from each other, for example, using telescoping buffers. In the illustrated example, *n* stages 60 are illustrated. ***A predecessor state may be coupled to a successor state by a transition 53.*** A sequence of states 52 from stage 1 60a to stage *n* 60n coupled by transitions 53 form a path of transition graph 50. (Emphasis added).

## II.    Rejections Under 35 U.S.C. § 103(a) Over *Anandalingam* in View of Official Notice

Claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 stand rejected under 35 U.S.C. § 103(a) over *Anandalingam* in view of Official Notice.

Applicants respectfully submit that while Applicants' claims in their prior, unamended form are not rendered obvious by the combination of *Anandalingam* and the Examiner's Official Notice, in an effort to expedite prosecution of the Subject Application, Applicants submit current claim amendments that more distinctly point out and claim that which Applicants regard as the invention and provide additional clarification as to how Applicants' claimed elements differ from the disclosure of *Anandalingam*.

In rejecting Claim 1, the Examiner states the following:

> Anandalingam discloses a method for generating set of constraints, the method comprising generating a transition graph comprising a plurality of stages, each stage representing a time interval and comprising one or more states and a plurality of paths, each path comprising a plurality of states, each state having a value, an inventory value, and a state value, the transition graph being generated by repeating the following for a the plurality of stages until a final stage is reached: determining the value of a successor state; calculating the inventory value of the successor state using the value and the inventory value of a predecessor state; and calculating the state value of the successor state using the value of the predecessor state; selecting a path of the plurality of paths according to the state values of the one or more states; and determining a schedule from the selected path. (***e.g. pg 1, pg 2, noting that a hierarchical optimization involves repeating for K levels an optimization of each level, the constraints of one level being the start of the next level***).

(20 October 2009, Non-Final Office Action, pages 6-7). Applicants respectfully disagree with all of the above. More specifically, *Anandalingam* fails to disclose "***generating a transition graph comprising a plurality of stages, each stage representing a time interval and comprising one or more states and a plurality of paths***," each path comprising a plurality of

states, *the plurality of states having at least one predecessor state that is coupled to at least one successor state by a transition, each state having a price value, an inventory value, and a state value*, the transition graph is generated by repeating the following for the plurality of stages until a final stage is reached," as required by Applicants' Claim 1, as amended. Applicants respectfully direct the Examiner's attention to pages 1 and 2 of *Anandalingam*, provided below, on which the Examiner relies:

1.  **Problem formulation**

Hierarchical optimization was first defined by Bracken and McGill [18,19] as a generalization of mathematical programming. In this context, the constraint region is implicitly determined by a series of optimization problems which must be solved in a predetermined sequence.

The problem is to find vectors $x$ and $v^i$ ($i = 1, \ldots, m$) to

$$\text{minimize } f(x)$$
$$x \in X$$

$$\text{subject to } h_i(x) = \min_{v^i \in V^i} g^i(x, v^i) \geq 0, \quad i = 1, \ldots, m. \tag{1}$$

A variation of this problem is to find vectors $x$, $u^i$ ($i = 1, \ldots, m$) and $v^i$ ($i = 1, \ldots, m$) to

$$\text{minimize } f(x)$$
$$x \in X$$

$$\text{subject to } \bar{h}_i(x) = \max_{u^i \in U^i(x)} \min_{v^i \in V^i} g^i(x, u^i, v^i) \geq 0, \quad i = 1, \ldots, m. \tag{2}$$

If $X$, $U^i(\cdot)$ and $V^i$ ($i = 1, \ldots, m$) are convex sets, $f(x)$ is a convex function of $x$, and $g^i(x, u^i, v^i)$ is concave in $x$ and $u^i$ for every $v^i \in V^i$ ($i = 1, \ldots, m$), then, with several mild restrictions, the mathematical program (2) is convex. If in addition $g^i(x, u^i, v^i)$ is convex in $v^i$, this program has a saddle point. Bracken and McGill [22] present solution techniques for (2) which employ the sequential unconstrained minimization technique (SUMT) of Fiacco and McCormick [26] for the outer problem. Bracken et al. [20] show that the mathematical program (1) can be transformed into (2) and is thus equivalent to it. Therefore, computational procedures based on SUMT can be used to solve (1) as well.

Recent research on hierarchical optimization problems has generalized the early work. In order to give mathematical formulations of such generalizations, consider a system comprised of $K$ levels, each characterized by individual functions $f^i$, $i = 1, \ldots, K$, defined over a jointly dependent constraint set $S$, which are to be maximized by the respective players. Assume that decisions are made sequentially beginning with player 1 who has control over a vector $x^1 \in X^1$, followed by player 2 who has control over a vector $x^2 \in X^2$, down through player $K$ who has control over a vector $x^K \in X^K$, where $x^i$ are nonempty subsets of $\mathbb{R}^n$; $x^i \cap X^j = \varnothing$, $i \neq j = 1, \ldots, K$, $n = n^1 + \ldots + n^K$; and $x = (x^1, \ldots, x^K) \in \mathbb{R}^n$. Further assume that $S$ is a compact subset of $\mathbb{R}^n$, $x$ is in $S$, and each $f^i$ maps $S$ into $\mathbb{R}^1$. By implication, the choice made by a higher-level player may affect the choices available to a lower-level player through $S$; the strategy selected by any member of the system, however, may influence the outcome realized by any other member through the latter's objective function. The following nested hierarchical optimization problem captures this structure:

P1   $\quad$ maximize $f^1$ $\quad$ where $x^2$ solves
     $\quad\quad x^1 \in X^1$

$\quad\quad$ maximize $f^2$ $\quad$ where $x^3$ solves
     $\quad\quad x^2 \in X^2$

$\quad\quad\quad\quad \vdots$

$\quad\quad$ maximize $f^{K-1}$ $\quad$ where $x^K$ solves
     $\quad\quad x^{K-1} \in X^{K-1}$

$\quad\quad$ maximize $f^K$
     $\quad\quad x^K \in X^K$

As shown above, the portion of *Anandalingam* relied upon by the Examiner merely disclose, among other things, ***selecting vectors to minimize a function,*** which is not analogous to "***generating a transition graph comprising a plurality of stages, each stage representing a time interval and comprising one or more states and a plurality of paths***, each path comprising a plurality of states, ***the plurality of states having at least one predecessor state that is coupled to at least one successor state by a transition, each state having a price value, an inventory value, and a state value***, the transition graph is generated by repeating the following for the plurality of stages until a final stage is reached," as recited in Claim 1, as amended. Applicants respectfully submit that the Examiner misinterprets the nested hierarchical optimization problem disclosed in *Anandalignam* as "***a transition graph comprising a plurality of stages, each stage representing a time interval and comprising one or more states and a plurality of paths***, each path comprising a plurality of states, . . . ***the transition graph is generated by repeating the following for the plurality of stages until a final stage is reached.***" The mere fact that a nested hierarchical optimization problem "***involves repeating for K levels an optimization of each level, the constraints of one level being the start of the next level***" as asserted by the Examiner, does not render solving a hierarchical optimization problem for vectors to minimize a function to be analogous to generating a "***transition graph comprising a plurality of stages, each stage representing a time interval and comprising one or more states and a plurality of paths***" as required by Claim 1.

In fact, the portions of *Anandalingam* relied on by the Examiner do not make any mention of an actual ***graph***, but merely, among other things, disclose a ***series of optimization problems*** that must be solved in a "predetermined sequence." Applicants respectfully submit that solving problems in a predetermined sequence does not equate to a "***transition graph comprising a plurality of stages***," as required by Claim 1. Furthermore, Applicants respectfully submit that the above-referenced portions of *Anandalingam* are silent and thus, fail to disclose "each stage representing a time interval and comprising one or more states and a plurality of paths," as required by Claim 1 and respectfully request clarification from the Examiner as to which portions of the mathematical functions shown above the Examiner asserts as being analogous to ***stages*** that ***represent a time interval*** and comprise one or more ***states*** and a ***plurality of paths***.

Still further, Applicants respectfully submit that the portions of *Anandalingam* relied on by the Examiner are also silent and thus, *fail to disclose* a " *plurality of states having at least one predecessor state that is coupled to at least one successor state by a transition."* Merely making decisions sequentially such that choices made earlier affect the choices available later on is not analogous to a *"predecessor state* that is *coupled to* at least *one successor state by a transition,"* as required by Claim 1, as amended.

Accordingly, for at least the reasons discussed in detail above, Applicants respectfully submit that Claims 1, 9, 17, and 25 contain unique and novel limitations that are not disclosed by *Anandalingam* or the Examiner's Official Notice, whether taken individually or in combination. Thus, Applicants respectfully traverse the Examiner's rejection of Claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 as obvious under 35 U.S.C. § 103(a) over the proposed combination of *Anandalingam* and the Examiner's Official Notice and respectfully request that the rejections under 35 U.S.C. § 103(a) be withdrawn.

### A.     The Office Action Acknowledges that *Anandalingam* Fails to Disclose Various Limitations Recited in Applicants' Claims

Applicants respectfully submit that the Office Action acknowledges, and Applicants agree, that *Anandalingam* fails to disclose various limitations recited in Claim 1. Specifically the Examiner acknowledges that:

> Anandalingam does not specifically disclose that the optimization is for a pricing plan, or that the optimization is used to generate an optimized pricing plan for a product.

(20 October 2009, Non-Final Office Action, page 7). However, the Examiner asserts Official Notice over the acknowledged shortcomings in *Anandalingam.* Applicants respectfully traverse the Examiner's assertion of Official Notice. In that regards, the Examiner states:

> However, this Examiner took Official Notice in a previous Office Action of the parent application (see the Non-final Rejection of 17 September 2008 **in parent case 09/896388**) that it is old and well-known as well as common place in the field of operations research to use mathematical optimization models to determine the pricing of items.

(20 October 2009, Non-Final Office Action, page 7). Applicants respectfully point out that the subject case is U.S. Patent Application Serial No. 09/896,388 and therefore, respectfully request clarification regarding the above-Examiner's statement.

**III.    The Office Action Fails to Properly Establish a *Prima Facie* case of Obviousness over the Proposed *Anandalingam*-Official-Notice Combination According to the UPSTO Examination Guidelines**

Applicants respectfully submit that the Office Action fails to properly establish a *prima facie* case of obviousness based on the proposed combination of *Anandalingam* or Official Notice, either individually or in combination, and in particular, the Office Action fails to establish a *prima facie* case of obviousness based on the "Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*" (the "Guidelines").

As reiterated by the Supreme Court in *KSR International Co. v. Teleflex Inc.* (*KSR*), the framework for the objective analysis for determining obviousness under 35 U.S.C. 103 is stated in *Graham v. John Deere Co.* (383 U.S. 1, 148 USPQ 459 (1966)). Obviousness is a question of law based on underlying factual inquiries. These factual inquiries enunciated by the Court are as follows:

(1) Determining the scope and content of the prior art;
(2) Ascertaining the differences between the claimed invention and the prior art; and
(3) Resolving the level of ordinary skill in the pertinent art.

(Notice, 72 Fed. Reg. 57527 (Oct. 10, 2007)). Objective evidence relevant to the issue of obviousness must be evaluated by Office personnel. (383 U.S. 17–18, 148 USPQ 467 (1966)). As stated by the Supreme Court in *KSR*, "While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls." (*KSR*, 550 U.S. at __, 82 USPQ2d at 1391).

However, it is important to note that the Guidelines require that Office personnel "*ensure that the written record includes findings of fact concerning the state of the art and the teachings*

*of the references applied.* (Notice, 72 Fed. Reg. 57527 (Oct. 10, 2007)). In addition, the Guidelines remind Office personnel that the "*factual findings made by Office personnel are the necessary underpinnings to establish obviousness.*" (*id.*). Further, "*Office personnel must provide an explanation to support an obviousness rejection* under 35 U.S.C. 103. (*id.*). In fact, "35 U.S.C. 132 requires that the applicant be notified of the reasons for the rejection of the claim so that he or she can decide how best to proceed" and "clearly setting forth findings of fact and the rationale(s) to support a rejection in an Office action leads to the prompt resolution of issues pertinent to patentability." (*id.*).

With respect to the subject application, the Office Action has not shown the *factual findings necessary to establish obviousness* or even *an explanation to support the obviousness rejection* based on the proposed combination of *Anandalingam* and Official Notice. The Office Action merely states that "it would have been obvious to a person having ordinary skill in the art to add in time constraints as one of the constraints in Anandalingam." (20 October 2009, Non-Final Office Action, page 9). Applicants respectfully disagree and respectfully submit that the Examiner's conclusory statement is not sufficient to establish the *factual findings necessary to establish obviousness* and is not a sufficient *explanation to support the obviousness rejection* based on the proposed combination of *Anandalingam* and Official Notice. *Applicants respectfully request that the Examiner provide proper support for the obviousness rejection under 35 U.S.C. 103 as necessitated by the Guidelines, including the factual findings necessary to establish obviousness to* "*ensure that the written record includes findings of fact concerning the state of the art and the teachings of the references applied.* (Notice, 72 Fed. Reg. 57527 (Oct. 10, 2007)).

The Guidelines further provide guidance to Office personnel in "determining the scope and content of the prior art" such as, for example, "Office personnel must first obtain a thorough understanding of the invention disclosed and claimed in the application." (Notice, 72 Fed. Reg. 57527 (Oct. 10, 2007)). The scope of the claimed invention must be clearly determined by giving the claims the "broadest reasonable interpretation consistent with the specification." (*See* Phillips v. AWH Corp., 415 F.3d 1303, 1316, 75 USPQ2d 1321, 1329 (Fed. Cir. 2005) and MPEP § 2111.). In addition, the Guidelines state that any "*obviousness rejection should include*, either explicitly or implicitly in view of the prior art applied, *an indication of the level of ordinary skill.*" (Notice, 72 Fed. Reg. 57528 (Oct. 10, 2007)). With respect to the subject Application, the Office

Action has not provided *an indication of the level of ordinary skill. Applicants respectfully request that the Examiner provide proper support for the obviousness rejection under 35 U.S.C. 103 as necessitated by the Guidelines, including an indication of the level of ordinary skill, relied upon by the Examiner.* (Notice, 72 Fed. Reg. 57527 (Oct. 10, 2007)).

The Guidelines still further provide that once the *Graham* factual inquiries are resolved, Office personnel must determine whether the claimed invention would have been obvious to one of ordinary skill in the art. (*Id.*). For example, the Guidelines state that *Office personnel must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art.* (*Id.*). In addition, the Guidelines state that the proper analysis is *whether the claimed invention would have been obvious to one of ordinary skill in the art after consideration of all the facts.* (*Id.* and *See* 35 U.S.C. 103(a)).

With respect to the subject Application, the Office Action has not expressly resolved any of the *Graham* factual inquiries to determine whether Applicants' invention would have been obvious to one of ordinary skill in the art. In addition, the Office Action fails to *explain why the difference(s) between the proposed combination of Anandalingam, Official Notice and Applicants claimed invention would have been obvious to one of ordinary skill in the art.* The Office Action merely states that "for the purpose of making the model a more accurate depiction of reality." (20 October 2009, Non-Final Office Action, Page 9). Applicants respectfully disagree and further respectfully request clarification as to how this statement *explains why the difference(s) between the proposed combination of Anandalingam, Official Notice and Applicants' claimed invention would have been obvious to one of ordinary skill in the art.* Applicants further respectfully submit that the Examiner is using the subject Application as a template to formulate reconstructive hindsight, which constitutes impermissible use of hindsight under 35 U.S.C. § 103(a).

The Guidelines yet further state that the "key to supporting any rejection under 35 U.S.C. 103 is the *clear articulation of the reason(s) why the claimed invention would have been obvious.*" (Notice, 72 Fed. Reg. 57528 (Oct. 10, 2007)). In fact, the Supreme Court in *KSR* noted that *"the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit."* (*id.*). The Court quoting *In re Kahn* (441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006)),

stated that "'[R]ejections on *obviousness cannot be sustained by mere conclusory statements*; instead, there *must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.*'" (*KSR*, 550 U.S. at __, 82 USPQ2d at 1396). The Guidelines provide the following seven rationales:

(A) Combining prior art elements according to known methods to yield predictable results;

(B) Simple substitution of one known element for another to obtain predictable results;

(C) Use of known technique to improve similar devices (methods, or products) in the same way;

(D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

(E) "Obvious to try"—choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

(F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art;

(G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

Applicants respectfully submit that the *Office Action fails to provide any articulation, let alone, clear articulation of the reasons why Applicants' claimed invention would have been obvious*. For example, the *Examiner has not adequately supported the selection and combination of Anandalingam and Official Notice to render obvious Applicants' claimed invention*. The Examiner's unsupported conclusory statements that "it would have been obvious to a person having ordinary skill in the art to add in time constraints as one of the constraints in Anandalingam" and "for the purpose of making the model a more accurate depiction of reality," *does not adequately provide clear articulation of the reasons why Applicants claimed invention would have been obvious*. (20 October 2009, Non-Final Office Action, page 9). In addition, the Examiner's unsupported conclusory statement fails to meet any of the Guidelines rationales to render obvious Applicants' claimed invention.

Thus, if the Examiner continues to maintain the obvious rejection based on the proposed combination of *Anandalingam* and Official Notice, *Applicants respectfully request that the*

*Examiner provide proper support for the obviousness rejection under 35 U.S.C. 103 as necessitated by the Guidelines, including a statement by the Examiner identifying which one of the seven rationales the Examiner is relying on and the proper analysis of that particular rationale, as required by the Guidelines.*

## IV.    Applicants' Claims are Patentable over *Anandalingam* in view of Official Notice

Applicants respectfully submit that Claim 1 is considered patentably distinguishable over the proposed combination of *Anandalingam* and Official Notice. This being the case, Claims 9, 17, and 25 are also considered patentably distinguishable over the proposed combination of *Anandalingam* and Official Notice, for at least the reasons discussed above in connection with Claim 1.

Furthermore, with respect to dependent Claims 4, 5, 7, 12, 13, 15, 20, 21, and 23: Claims 4, 5, and 7 depend from Claim 1; Claims 12, 13, and 15 depend from Claim 9; and Claims 20, 21, and 23 depend from Claim 17. As mentioned above, each of Claims 1, 9, 17, and 25 are considered patentably distinguishable over *Anandalingam* and Official Notice. Thus, dependent Claims 4, 5, 7, 12, 13, 15, 20, 21, and 23 are considered to be in condition for allowance for at least the reason of depending from an allowable claim.

For at least the reasons set forth herein, the Applicants respectfully submit that Claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 are not rendered obvious by the proposed combination of *Anandalingam* and Official Notice. The Applicants further respectfully submit that Claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 are in condition for allowance. Thus, the Applicants respectfully request that the rejection of Claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 under 35 U.S.C. § 103(a) be reconsidered and that Claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 be allowed.

## CONCLUSION:

In view of the foregoing amendments and remarks, this application is considered to be in condition for allowance, and early reconsideration and a Notice of Allowance are earnestly solicited.

Although Applicant believes no additional fees are deemed to be necessary; the undersigned hereby authorizes the Director to charge any additional fees which may be required, or credit any overpayments, to **Deposit Account No. 500777**. If an extension of time is necessary for allowing this Response to be timely filed, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) to the extent necessary. Any fee required for such Petition for Extension of Time should be charged to **Deposit Account No. 500777**.

**Please link this application to Customer No. 53184 so that its status may be checked via the PAIR System.**

Respectfully submitted,


13 January 2010                          /Steven J. Laureanti/signed
Date                                 Steven J. Laureanti, Registration No. 50,274

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